DYNAMICS OF FISH POPULATIONS

The use of population models to predict the effect of changes in growth and mortality rates is now a well-established branch of fishery biology. The mathematical skills required to develop, select, and apply these models are, unfortunately, not possessed by all fishery biologists. This unit will keep informed on modern developments in theory, select and develop models for application to species under investigation at this laboratory, and advise the species investigations on population dynamics problems. In addition, it will advise on the proper statistical methods for experimental design and analysis.

August 6, 1959

DYNAMICS OF FISH POPULATIONS

List of Projects

1. Assessment of mesh regulation
2. Growth rates of Georges Bank haddock
3. Population dynamics of cod
4. Population dynamics of redfish
5. Population dynamics of silver hake

SUMMARY CO[illegible]OL SCHEDULE

Investigation: Dynamics of Fish Populations
Biological Laboratory: Woods Hole, Mass.

Project Title	Est.* Cost	Fiscal Years 57	58	59	60	61	62	63	64	65	66
1. Assessment of Mesh Regulation	74.8	6.7	5.8	6.0	3.1	7.2	7.2	9.4	9.4	10.0	10.0
2. Growth Rates of Georges Bank Haddock before & after regu.	74.7	6.5	6.6	5.9	3.0	6.8	7.2	9.3	9.4	10.0	10.0
3. Population Dynamics of Cod Stocks	70.5	6.5	5.6	5.9	3.0	5.6	7.2	8.5	9.6	9.2	9.4
4. Population Dynamics of Redfish Stocks	63.2	3.4	5.6	5.0	3.0	5.6	5.7	9.3	8.6	8.5	8.5
5. Population Dynamics of Silver Hake	60.3	3.3	5.5	5.0	2.0	5.4	5.4	8.3	8.4	8.5	8.5
Investigation Total	343.5	26.4	29.1	27.8	14.1	30.6	32.7	44.8	45.4	46.2	46.4

Annual Review			Date
Laboratory	Regional or Area Office	Washington Office	Prepared by: 8/6/59
			Recommended by: Date
			Lab. Director Herbert W. Graham 8/6/59
			Reg. or Area Dir.
			Branch Chief
			Approved by: 12-24-59
			Division Chief for Director

*Total needed by Laboratory for Project in thousands of dollars.

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U. S. Fish and Wildlife Service
Bureau of Commercial Fisheries

Sheet No. 1

Location: Woods Hole, Mass.
Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Assessment of the effect of the ICNAF mesh regulation on Georges Bank haddock yields

Investigation Title: Dynamics of Fish Populations

Investigation Chief: Vacant

Project Leader: Vacant
Name — Title — Grade

Assistants: (Title and Grade)

Collaborators:

Need for Information: The Laboratory has a commitment to ICNAF to assess the effect of the present and any future regulation.

Objective: To measure, if possible, the amount of benefit resulting from mesh regulation and to improve upon present statistical technique used in such analyzes.

Method of Procedure: Statistical evaluation and population model studies based on the available haddock data.

Phase 1:

Phase 2:

File No.:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total Needed by Laboratory for Complete Project 74.8

	FY 1959	FY 1960	FY 1961
Personal Services	2.6	3.1	3.5
Other Expenses:			
Within Project	--	--	--
	--	--	--
Lab. Adm. & Ser.	3.4	--	3.7
Lab. Total	6.0	3.1	7.2
Regional Office	.06	.031	.072
Washington Office			
Total			

Recommended Source of Funds S-K and Regular
(S-K, Regular, Contributed, etc.)

Estimated Date of Completion: Phase 1 FY ; Phase 2 FY ; Phase 3 FY ; Project FY 66

Recommended by: Date
Originator
Investigation Chief
Laboratory Director Herbert W. Graham 8/6/59
Regional Director Joseph T. Dunecliff 8/19/59
Branch Chief 2HE 12-24-59
Approved by:
Division Chief for Director

Remarks

(Continue on reverse side)

U. S. Fish and Wildlife Service
Bureau of Commercial Fisheries

Sheet No. 1

Location: Woods Hole, Mass.
Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Growth Rate of Georges Bank haddock before and after regulation

Investigation Title: Dynamics of Fish Populations

Investigation Chief: Vacant

Project Leader: Vacant
Name — Title — Grade

Assistants: (Title and Grade)

Collaborators:

Need for Information: It is required for management of the resource.

Objective: To determine the effect of the ICNAF mesh regulation on the growth rate of haddock.

Method of Procedure:

Phase 1: Keep the annual growth rate data of the Georges Bank Haddock stocks under careful review.

Phase 2: Prepare reports.

Dyn Fish Pops - 2
Sheet No. 2 File No.:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total Needed by Laboratory for Complete Project 74.7

	FY 1959	FY 1960	FY 1961
Personal Services	2.5	3.0	3.2
Other Expenses:			
Within Project	1.9	--	0.1
--	--	--	--
Lab. Adm. & Ser.	1.5	--	3.5
Lab. Total	5.9	3.0	6.8
Regional Office	.059	.03	.068
Washington Office			
Total			

Recommended Source of Funds S-K and Regular
(S-K, Regular, Contributed, etc.)

Estimated Date of Completion: Phase 1 FY ; Phase 2 FY ; Phase 3 FY ; Project FY 66

Recommended by:

		Date
Originator		
Investigation Chief		
Laboratory Director	Herbert W. Graham	8/6/59
Regional Director	Joseph A. Pomeroy	8/19/59
Branch Chief	[illegible]	12-24-59

Approved by:

Division Chief for Director [illegible]

Remarks

(Continue on reverse side)

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U. S. Fish and Wildlife Service
Bureau of Commercial Fisheries

Sheet No. 1

Location: Woods Hole, Mass.
Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Population Dynamics of Cod Stocks

Investigation Title: Population Dynamics

Investigation Chief: Vacant

Project Leader: Vacant
Name Title Grade

Assistants: (Title and Grade)

Collaborators:

Need for Information: It is required for management of the resource.

Objective: To predict and measure the effect of mesh regulation on cod yields.

Method of Procedure:

Phase 1: Application of population dynamics theory to the cod data

Phase 2: Prepare reports

Dyn Fish Pops - 3

Sheet No. 2 File No.:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total Needed by Laboratory for Complete Project 70.5

	FY 1959	FY 1960	FY 1961
Personal Services	2.5	3.0	2.0
Other Expenses:			
Within Project	--	--	0.1
	--	--	--
Lab. Adm. & Ser.	3.4	--	3.5
Lab. Total	5.9	3.0	5.6
Regional Office	.059	.03	.056
Washington Office			
Total			

Recommended Source of Funds **S-K and Regular**
(S-K, Regular, Contributed, etc.)

Estimated Date of Completion: Phase 1 FY ; Phase 2 FY ; Phase 3 FY ; Project FY 66

Recommended by: Date

Originator

Investigation Chief

Laboratory Director Herbert W. Graham 8/6/59

Regional Director Joseph A. Pomeroy 8/19/59

Branch Chief [illegible] 12-24-59

Approved by:

Division Chief for Director [illegible]

Remarks

(Continue on reverse side)

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U. S. Fish and Wildlife Service
Bureau of Commercial Fisheries

Sheet No. 1

Location: Woods Hole, Mass.
Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Population Dynamics of Redfish Stocks

Investigation Title: Population Dynamics

Investigation Chief: Vacant

Project Leader: Vacant
Name Title Grade

Assistants: (Title and Grade)

Collaborators:

Need for Information: Required for management of the resource

Objective: To determine rates of growth, natural and fishing mortalities in order to assess the effects of fishing on redfish stocks.

Method of Procedure:

Phase 1: Calculate parameters from available data and apply population dynamics theory to these data

Phase 2: Write reports on conclusions

Dyn Fish Pops - 4
Sheet No. 2

File No.:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total Needed by Laboratory for Complete Project 63.2

	FY 1959	FY 1960	FY 1961
Personal Services	2.0	3.0	2.0
Other Expenses:			
Within Project	--	--	0.1
	--	--	--
Lab. Adm. & Ser.	3.0	--	3.5
Lab. Total	5.0	3.0	5.6
Regional Office	.05	.03	.056
Washington Office			
Total			

Recommended Source of Funds _____
(S-K, Regular, Contributed, etc.)

Estimated Date of Completion: Phase 1 FY ; Phase 2 FY ; Phase 3 FY ; Project FY 66+

Recommended by:

		Date
Originator		
Investigation Chief		
Laboratory Director	Herbert W. Graham	8/6/59
Regional Director	Joseph H. Blunchter	8/19/59
Branch Chief	[illegible]	12-24-59
Approved by:		
Division Chief for Director	[illegible]	1-4 60

Remarks

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U. S. Fish and Wildlife Service
Bureau of Commercial Fisheries

Sheet No. 1

Location: Woods Hole, Mass.
Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Population Dynamics of Silver Hake

Investigation Title: Population Dynamics

Investigation Chief: Vacant

Project Leader: Vacant
Name Title Grade

Assistants: (Title and Grade)

Collaborators:

Need for Information: Required for management of the resource.

Objective: To determine rates of growth, natural and fishing mortalities in order to assess the effects of fishing on silver hake stocks.

Method of Procedure:

Phase 1: Calculate parameters from available data and apply population dynamics theory to these data.

Phase 2: Write reports.

Dyn Fish Pops - 5
Sheet No. 2

File No.:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total Needed by Laboratory for Complete Project 60.3

	FY 1959	FY 1960	FY 1961
Personal Services	2.0	2.0	2.0
Other Expenses:			
Within Project	--	--	--
	--	--	--
Lab. Adm. & Ser.	3.0	--	3.4
Lab. Total	5.0	2.0	5.4
Regional Office	.05	.02	.054
Washington Office			
Total			

Recommended Source of Funds _____
(S-K, Regular, Contributed, etc.)

Estimated Date of Completion: Phase 1 FY ___; Phase 2 FY ___; Phase 3 FY ___; Project FY 66

Recommended by: Date
Originator _____ _____
Investigation Chief _____
Laboratory Director Herbert W. Graham 8/6/59
Regional Director Joseph F. Passmore 8/19/59
Branch Chief _____ 12-24-59
Approved by:
Division Chief for Director _____

Remarks

(Continue on reverse side)

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